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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,613	02/18/2004	Makoto Iwashima	50195-417	8884

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EXAMINER

PRESTON, ERIK D

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 09/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

4A

Office Action Summary	Application No. 10/779,613	Applicant(s) IWASHIMA ET AL.	
	Examiner Erik D. Preston	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>02/18/2004</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9,11,14-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishiyama (US 5632351).

With respect to claim 1, Ishiyama teaches a power converter arranged in series with a motor to form a unitary structure through which an output shaft extends, comprising: A plurality of coolers (Fig. 8, #47) each of which is disposed along an extending direction radially extending (though they may extend further in an axial direction, they still do extend in a radial direction (as can be seen in Fig. 9)) from an output shaft (Fig. 4, #13) to be perpendicular to the output shaft, with each of the plurality of coolers having a cooling surface along the extending direction; and a power semiconductor module (Fig. 10, #11) mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor (Fig. 2, #12).

With respect to claim 2, Ishiyama teaches the power converter of claim 1, wherein the output shaft includes a motor shaft.

With respect to claim 3, Ishiyama teaches the power converter of claim 1, wherein each of the plurality of coolers includes a plurality of cooling surfaces (the top

and bottom surfaces of the coolers), and each of the plurality of cooling surfaces is arranged along the extending direction of a corresponding one of the plurality of coolers.

With respect to claim 4, Ishiyama teaches the power converter of claim 1, wherein each of the plurality of coolers includes a set of coolers (the cooling fins) opposing one another, and each of the set of coolers extends along the extending direction radially extending from the output shaft to be perpendicular to the output shaft.

With respect to claim 5, Ishiyama teaches the power converter of claim 1, wherein each of the plurality of coolers is mounted on a cylindrical structural member (Fig. 1, #201) surrounding the output shaft.

With respect to claim 6, Ishiyama teaches the power converter of claim 1, wherein each of the plurality of coolers is mounted on a structural member located at an end face of a motor (as seen in Fig. 1).

With respect to claim 7, Ishiyama teaches the power converter of claim 1, wherein each of the plurality of coolers includes a plurality of coolant passageways that extend in parallel to the output shaft (as seen in Fig. 9).

With respect to claim 8, Ishiyama teaches the power converter of claim 1, wherein each of the plurality of coolers includes a plurality of cooling passageways that extend along the extending direction of a corresponding one of the plurality of coolers.

With respect to claim 9, Ishiyama teaches the power converter of claim 1, wherein an end portion of each of the plurality of coolers is connected to a delivery conduit (Fig. 6, #42 & 43) communicating with coolant passages of the other of the plurality of coolers.

With respect to claim 11, Ishiyama teaches the power converter of claim 1, further comprising a capacitor (Fig. 5, #34) disposed between respective ones of the plurality of coolers (a part of the capacitor is disposed at a radial position that is located between modules 21 & 23) adapted to smooth a DC voltage.

With respect to claim 14, Ishiyama teaches the power converter of claim 1, further comprising a current sensor (Fig. 2, #29 # 30) disposed in a corner section projecting from a cross sectional circular shape of a power converter and detecting output currents of the power semiconductor module.

With respect to claim 15, Ishiyama teaches the power converter of claim 1, further comprising an AC output terminal (Fig. 2, #26) disposed in a corner section projecting from a cross sectional circular shape of a power converter and connecting a power converter and a motor.

With respect to claim 16, Ishiyama teaches the power converter of claim 15, wherein the AC output terminal is a three-phase output terminal and has three output terminals (Fig. 2, #26-28), and each of the three output terminals is disposed in a corresponding one of three corner sections projecting from the cross sectional circular shape of the power converter.

With respect to claim 17, Ishiyama teaches the power converter of claim 1, further comprising a DC power input terminal (Fig. 2, #39) disposed in a corner section, projecting from a cross sectional circular shape of a power converter, in which no other component elements are located.

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With respect to claim 18, Ishiyama teaches a method of arranging a cooler and a power semiconductor module in a power converter to be formed in series with a motor in a unitary structure through which an output shaft extends, the method comprising: Locating a plurality of coolers along an extending direction radially extending from an output shaft to be perpendicular to the output shaft, with each of the plurality of coolers having a cooling surface along the extending direction; and mounting a power semiconductor module on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishiyama (US 5632351) in view of Gründl et al. (US 2004/0164625). Ishiyama teaches the power converter of claim 1, wherein an end portion of each of the plurality of coolers is connected to a coolant passage connected to a coolant delivery conduit connected to a power converter, but it does not teach that the coolant passage is annular. However, Gründl teaches a plurality of coolers (Fig. 1, #40) connected to an annular coolant passage (Fig. 1, #32). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cooling passage of Ishiyama in view of the

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coolant passage as taught by Gründl because it has a compact arrangement which can be produced economically and is reliable in operation (Gründl, Paragraph 15).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishiyama (US 5632351) in view of Kim et al. (US 2001/0054730). Ishiyama teaches the power converter of claim 11, but does not teach that the capacitor has a cross sectional shape formed in a fan-shape or a trapezoid. However, Kim teaches a capacitor that has a trapezoidal cross sectional shape (Paragraph 30). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the capacitor of Ishiyama in view of the capacitor as taught by Kim because it has a high dielectric constant while avoiding a degradation in the capacitance (Kim, Paragraphs 6,8 & 11).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishiyama (US 5632351) in view of Jackson et al. (US 2942165). Ishiyama teaches the power converter of claim 1, wherein each of the plurality of coolers has a pair of cooling surfaces, and terminals of the power semiconductor module are mounted on one of the pair of cooling surfaces, but it does not teach that the power semiconductor module is mounted on both sides of the coolers, or that terminals of the power semiconductor modules have a symmetric relationship with those on the other cooling surfaces with respect to a corresponding one of the plurality of coolers. However, Jackson teaches a cooler (Fig. 2, #6) with a pair of cooling surfaces upon each of which is mounted a semiconductor device (Fig. 2, #1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the coolers of Ishiyama in view of the cooler as taught by Jackson because it provides a rectifier assembly that has a

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minimum bulk, but which dissipates heat losses with a high efficiency (Col. 1, Lines 42-45).


Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 4938280, US 4963778, US 5388024, US 5481433, US 5491370, US 5678646, US 5998893, US 6097051 & US 2005/0029476.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik D. Preston whose telephone number is 571-272-8393. The examiner can normally be reached on Monday through Friday 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


08/23/2005


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